The Behavior Analyst 1988, 11, 141–148 No. 2 (Fall)

Behavioral Obesity Research: Where Have All the Single Subjects Gone?

Jean E. Anderson and Alan M. Gross
University of Mississippi

Many recent reviews of the literature concerning behavioral treatments of obesity have concluded that behavioral methods have not been as successful in treating this problem as might have been predicted in the early years of behavior modification. Among the many potential reasons for this lack of success is the growing trend to utilize group statistical designs rather than single subject designs to examine the problem of obesity, in spite of the fact that single case methodology has provided the foundation for applied behavior analysis and behavior therapy. Several behavioral journals were surveyed to determine more precisely the trends in types of research strategies utilized in obesity studies. The potential relationship between research methodology and the development of effective treatments is discussed.

Key words: obesity, single case methodology, behavior therapy, treatment success, research design

---

With few exceptions, during the first half of the 20th century the case study approach was the sole methodology of clinical research (Hersen & Barlow, 1976). These case reports involved intensive investigation of an individual. Included in these studies was detailed information about the individual patient and treatment interventions. Based on these anecdotal data, therapists speculated about the variables responsible for successful psychotherapy (Kazdin, 1981). Case studies not only provided a means of communication among colleagues about therapy successes, but also led to the development of theories (and schools) of psychotherapy (Hersen & Barlow, 1976).

As clinical psychologists became more sophisticated methodologically, criticism of the case study method became more common. The information included in these studies was subject to numerous sources of bias and the anecdotal nature of most case reports did not include precise definitions of independent and dependent variables. Without experimental controls, conclusions concerning the relevant variables in the behavior change process were not possible.

The authors thank the anonymous reviewers for their helpful comments on earlier versions of this manuscript. Jean E. Anderson is at the Center for Women's Studies, University of Mississippi. Address reprint requests to Alan M. Gross, Department of Psychology, University of Mississippi, University, MS 38677.

Valid criticisms of case study methods, coupled with the fact that most applied researchers of this period were trained as psychologists, led to the widespread use of between-subject group research designs in applied research (Hersen & Barlow, 1976). Controversy soon arose, however, concerning the adequacy of group research methods in the examination of psychotherapy procedures.

The controversy regarding the usefulness of group research designs in psychotherapy research was, in part, prompted by papers written by Hans Eysenck (1952, 1965). After reviewing a number of well-controlled (group design) psychotherapy studies, Eysenck suggested that psychotherapy was ineffective. He noted that rates of improvement for individuals who received treatment were no better than rates of improvement for individuals who did not receive treatment. While many clinicians convinced of the effectiveness of psychotherapy simply rejected Eysenck's conclusions, his findings led to closer scrutiny of the differences in data in case studies and well-controlled experimental group comparisons involving similar psychotherapeutic interventions.

After careful examination of the data, Bergin (1966) reported that many subjects in group studies exhibited improvement while the condition of others deteriorated. He suggested that statistically averaging the data resulted in the effects cancelling each other out and making it appear that psychotherapy had no effect.

Bergin's critique suggested that experimental group designs were inadequate for the study of psychotherapy.

In addition to the criticism that averaging obscured individual clinical outcome data, the use of group methodology in clinical psychotherapy research was also criticized because it ignored intrasubject variability. The clinical course of individual patients is of great practical interest to clinicians. Group designs do not emphasize continuous repeated measurement, but instead favor between-subject comparisons. As such, this method greatly limits the clinician's ability to follow closely over time each subject's response to treatment.

Once again psychotherapy researchers were being encouraged to study the individual intensively and to abandon large group comparison research (e.g., Bergin & Strupp, 1970). In contrast to the earlier era of case study methods, however, a sophisticated methodology for single subject experimental investigation was now available to the applied researcher. This approach, known as the experimental analysis of behavior, grew out of the basic research of B. F. Skinner, who was attempting to discover lawful behavioral processes (Kazdin, 1982). Skinner emphasized repeated objective measurement of an individual subject's behavior over time.

Investigations in the experimental analysis of behavior initially involved the use of animal subjects. However, systematic extensions of this method to human behavior began to occur, and researchers quickly determined that the behavioral principles of operant psychology had therapeutic potential. Moreover, operant psychology's methodological reliance on intrasubject-replication designs (Sidman, 1960) was perfectly suited for clinical research, allowing the clinical researcher to monitor closely results of therapy. This single subject research method eliminated the need for large control groups while offering an experimental method of examining variables believed to be related to clinical behavior change.

Clinicians who adopted operant conditioning principles as the theoretical perspective from which they attempted to understand and alter human behavior were identified as behavior modifiers. Moreover, as a result of the experimental nature of operant psychology, behavior modification emphasized direct measurement of target behaviors and experimental evaluation of treatments.

Interest in behavior modification and single subject research methodology grew quickly in the late 1960s and early 1970s. Clinicians/researchers were confident that their reinforcement, punishment, extinction, stimulus control, and shaping procedures would prove effective in treating a wide variety of human behavior problems. As importantly, these scientists were eager to use operant methodology to validate the effectiveness of their procedures (Hersen & Barlow, 1976).

Over the past 20 years, behavioral methods have been applied to an enormous variety of problems. The optimistic expectations of behaviorists were fulfilled in many areas (e.g., Leitenberg, 1976). For example, there is little doubt that behavioral interventions are the treatment of choice for phobias, enuresis, and post-traumatic stress disorder. Improvements in social functioning in individuals with schizophrenia have been demonstrated (Bellack, 1986). Moreover, there have been numerous reports of the usefulness of behavioral methods in training life skills in mentally retarded individuals (Whitman & Johnston, 1987).

But there have been failures too. Behavioral treatment of obesity generated a great deal of excitment and activity in the late 1960s, and since that time it has become the treatment of choice for obesity (Brownell & Jeffrey, 1987). Recent reviews, however, suggest that the long-term effectiveness of behavior therapy in treating obesity (Brownell & Jeffrey, 1987) is very poor. Clearly, this particular behavior problem poses special difficulties for the therapist whose intervention is based on the ability to alter response-consequence relationships. One cannot separate the response (eating) from its rewarding consequence (taste) when dealing with consumatory behaviors.

Examining the long-term effectiveness of behavioral interventions in obesity research reveals that behavior therapy is not uniformly unsuccessful when treating these problems (Colvin & Crist, 1983). Some individuals improve, some show no change, and the condition of some patients deteriorates. These statements are surprisingly similar to those made 20 years ago when behavioral scientists discussed the issue of psychotherapy effectiveness. At that time the validity of psychotherapy was not successfully challenged; it was the method by which it was studied that was considered problematic.

Should, then, the failures of behavior therapy procedures to achieve significant behavior change in obesity treatments call into question the validity of the principles of behavior? Similar to what occurred in the early 1960s, when questions about the effectiveness of psychotherapy were raised by Eysenck, it seems unlikely that such data will undermine the confidence behavior therapists have in their procedures. In general, the data do not call for such a response, and it is not the intention of this paper to question the validity of behavioral technology. Nevertheless, the question as to why users of behavioral methods have had great difficulty producing significant behavior change in this area must be addressed. As a first step in addressing the issue of treatment effectiveness, it may once again be time to evaluate research methods.

The purpose of the present paper is to attempt to determine whether behavioral researchers in obesity have adhered to their operant training and consistently examined clinical issues using single subject methodology. Studies published in several behavioral journals will be surveyed and scrutinized for types of research designs employed. The potential relationship between methodology and the development of effective interventions will be discussed.

SURVEY

Only behavioral journals were chosen for the survey. Although hundreds of articles about obesity, including behavioral approaches toward the treatment of obesity, have been published, there is no particular expectation that nonbehavioral journals would emphasize single case methodology. The behavioral journals, however, might be expected to report research using single case methodology.

The journals selected for the survey were as follows: *Behaviour Research and Therapy* (BRT) (1963–1985), *Journal of Applied Behavior Analysis* (JABA) (1968–1985), *Behavior Therapy* (BT) (1970–1985), *Journal of Behavior Therapy and Experimental Psychiatry* (JBTEP) (1970–1985), *Behavior Modification* (BM) (1977–1985), *Journal of Behavioral Medicine* (JBM) (1978–1985), *Child and Family Behavior Therapy* (JCFBT) (1979–1985).

Every article in each of the journals listed above that described treatment of obesity in adults or children was surveyed. Case studies were included. The only articles focusing on obesity that were omitted were purely theoretical or review articles.

Each article was examined to determine what type of research methodology was employed: case study, single subject experimental design, or experimental group design. Case study was defined as any investigation using a single subject which did not employ a research strategy allowing evaluative statements concerning treatment effectiveness. Studies using an AB design were considered case studies. To be considered as using a single subject design, a research study reported individual data, repeated measures over time, and included a functional analysis of behavior with a systematic replication series. Group research designs involved between-group comparisons of essentially equivalent subjects who were randomly assigned to conditions (e.g., treatment vs. control).

A second observer independently reviewed 20% of the obesity articles included in this survey. The observer noted the type of research design employed. Interobserver comparisons revealed 100% agreement.

From 1963, when the first behavioral journal was published, through 1985, 119

articles appeared reporting attempts to treat the problem of obesity. None was reported until 1965, and only two were reported before 1971. Since 1971 the rate of publication has been consistent, with an average of approximately 8 papers per year (range 3–14).

The earliest articles on obesity were case studies, one in 1965, one in 1967, and one in 1971. A few case studies appeared during the years 1971 to 1974, but afterwards this type of research method was rarely reported in the literature. Only one was found after 1981 and that study used a very global treatment approach (Wyshogrod, 1985). The survey revealed a total of 14 published case studies.

One single subject design was reported in 1972, followed by one in 1974, and then none appeared until 1977. From 1 to 3 such articles were reported each year between 1977 and 1981, and no single subject research designs were seen in the behavioral obesity literature since 1981. The cumulative total was 11.

Combining case studies and single subject designs and then analyzing them to determine whether they used the strategy of examining individual data and taking repeated measures over time revealed wide variations. Although every study was based on individual data, in some instances data were grouped for actual presentation. Similarly, although repeated measures were taken in every case, repeated measures were not always reported in the article. Most, but not all, studies provided one or more graphs in the publication.

The use of some kind of functional analysis in single subject designs was sometimes difficult to evaluate. Some studies provided more experimental phases than others. Some manipulated only one variable at a time, and some used more global approaches or treatment packages. Most single subject designs did utilize a functional analysis, but the research designs varied considerably in scientific precision.

No group designs were published in the behavioral obesity literature until 1971, when four group studies appeared. During the years 1971, 1972, and 1973, the frequencies of group and single subject articles in obesity were not considerably different, but after 1973 group experimental designs became the primary methodology found in published obesity studies. The average number of group studies from 1974 through 1985 was 7.1, compared to 1.4 single subject and case study articles combined. The cumulative total of group studies through 1985 was 94.

The majority of obesity studies were published in BT. Fifty-six articles appeared, of which 49 employed group designs. BRT (30 articles, 27 group designs) and JBTEP (21 articles, 9 group designs) have published the largest number of the remaining obesity papers.

In summary, the survey revealed that a total of 119 articles involving obesity treatments were published between the years 1963 and 1985. The earliest published research involved case studies and single subject methods. However, after 1974 group methods became the dominant research strategy.

The purpose of this survey was to determine the most common research strategy employed by behavioral researchers involved in treating obesity. While it could be expected that behavioral clinicians would be the scientists most likely to use single subject methods, results of this analysis clearly reveal that the experimental group method was the dominant research strategy. This finding raises two important questions: Is the apparent failure of behavioral treatment of obesity related to reliance on experimental group methods? And why do behavioral researchers in obesity not behave in a manner more consistent with their theoretical background?

It would be extremely difficult to prove that the relatively low success rate in treating obesity is a function of clinical obesity researchers' reliance on large-scale group designs in exploring this complex problem. However, evidence suggests that the use of group studies may hinder efforts to develop effective treatment programs as well as obscure evidence of effective treatment when it occurs.

Reviews of the obesity treatment literature have consistently concluded that changes in weight as a result of behavior therapy interventions were small, patient variability was large, and studies rarely demonstrated generalized weight loss (Brownell & Jeffrey, 1987; Foreyt, Goodrick, & Gotto, 1981; Stunkard, 1977; Stunkard & Pennick, 1979; Wing & Jeffrey, 1979). Various reasons have been suggested to account for the poor showing of behavior therapy. For example, Mahoney (1975) suggested that many treatment programs are based on unproven assumptions about the eating style of obese individuals. He argues that in order to enhance the effectiveness of behavior therapy, research must examine the validity of these assumptions before designing treatments.

A number of authors have suggested that behavioral treatments may not be more effective because of their narrow definition of target behaviors. For example, Foreyt et al. (1981) suggest it is important to alter urges to eat in addition to actual eating behavior. Abramson (1983) has suggested that researchers expand treatment to include family members as a means of improving obesity treatments. Finally, the importance of recognizing the impact of physiological factors in weight reduction programs (e.g., the body's adjustment to reduced caloric intake appears to result in caloric conservation in terms of a lower rate of energy expenditure) has also been noted (Donahoe, Lin, Kirschenbaum, & Keesey, 1984; Wooley, Wooley, & Dyrenforth, 1979).

The most frequently mentioned criticism of obesity studies, however, is the failure to individualize treatment (Coates & Thoresen, 1980; Colvin & Crist, 1983; Foreyt et al., 1981; Hall & Hall, 1974; Jeffrey & Coates, 1978; Lansky, 1981). There seems to be almost unanimous recommendation that treatment programs be tailored to the characteristic lifestyles, particular problems, and behavioral histories of individual patients. The criticism is not aimed at the behavioral methods themselves (e.g., reinforcement for achieving dietary and exercise compliance, or altering stimulus control to reduce environmental cues for overeating) but at their application to groups without regard for differences in functional relations from one individual to another.

These global interventions are based on current knowledge concerning what methods have generally been successful in modifying behaviors associated with obesity. Attempts to develop an intervention to be used with all patients suggests that the traditional functional analysis model characteristic of behavior therapy has been abandoned. Although behavioral principles may guide treatment strategies, careful analysis of each individual and his or her environment is not undertaken.

The importance of individualized assessment and treatment is highlighted in a study conducted by Coates and Thoresen (1981). Two obese adolescents (a third youth served as a control) received training in behavioral strategies for weight reduction. Throughout baseline and treatment conditions observers entered the home and monitored meal time behaviors, food preparation, types of foods found in the refrigerator and cupboards, and whether or not food was stored in places that would increase the salience of eating cues. Experimental subjects displayed significant weight reductions. More importantly, results indicated that subjects differed in terms of pre-treatment problem behaviors. For one subject, treatment modified various eating behaviors (e.g., bite rate and sips per minute, meal durations). The other youth's treatment focused on the home environment: eating cues, types of food available. Apparently different variables controlled each subject's eating behaviors. Single subject methods allowed the experimenters to identify relevant target behaviors, eliminate unnecessary treatment strategies, and demonstrate the functional relationship between specific responses and weight loss.

Katell, Callahan, Fremouw, and Zitter (1979) monitored the eating behavior of an obese woman at home and in analog eating settings. Target behaviors included limiting eating to certain situations,

consuming acceptable snacks, and altering rate of eating. Following baseline, a behavioral intervention was implemented and successful outcome demonstrated that changes in eating behaviors were related to weight loss.

These two studies show that weight problems were a function of highly particular (different) response contingencies. The opportunity to make such discoveries is very limited in research that emphasizes large groups receiving predetermined treatments. Moreover, another major difficulty with group studies is the difficulty in determining controlling variables because averaged data eliminate intrasubject variability (e.g., Colvin & Crist, 1983; Straw & Terre, 1983).

Brownell and Stunkard (1978) reviewed a number of behavioral obesity studies and concluded that there was no strong evidence of a relationship between adherence to treatment regimens and weight loss. Lansky (1981) re-examined these studies and argued that Brownell and Stunkard's (1978) conclusions were not valid because the correlations between treatment behaviors and weight loss were obtained from grouped data. Lansky suggested that unless changing the same behavior for each subject is appropriate, it is not likely that significant relationships between treatment and weight loss will be obtained when data are averaged across subjects. In cases where a treatment is appropriate for an individual, a correlation between treatment and outcome would be expected. In cases where the treatment was inappropriate for the subject, no correlation would be expected. Combining data from different individuals would result in a statistically insignificant correlation (Lansky, 1981). Lansky also pointed out that only through studies that employ single subject methods (e.g., Coates & Thoresen, 1981) is it possible to examine accurately the relationship between treatment and outcome.

Hersen and Barlow (1976) have suggested that a series of single case studies replicated across various individuals will result in much more useful information than can be gathered from a large control group design. They also state that single subject methods are most appropriate for identifying mechanisms of therapeutic action. Single case methodology makes it possible to assess the effects of treatments over subjects and over time, so that actual behavioral changes are not obscured by averages obtained from a sample with large variance (Hall & Hall, 1974, Johnston & Pennypacker, 1980).

Although behavioral procedures have long focused on single subject strategies, this survey reveals that behavioral obesity researchers have abandoned those strategies. Currently, group research methods characterize behavioral obesity research, but it is not possible to be sure that this emphasis is responsible for the relatively poor outcomes of obesity treatments. It does appear, however, that treatments that fit into group comparison designs have had limited utility.[1]

Why then, despite their apparent failure to produce targeted outcomes, have group experimental methods replaced single subject designs in behavioral obesity research? The popularity of group experimentation involves long-standing biases toward this methodology. Academic research environments are generally composed of theoretically eclectic scientists, few of whom are sophisticated in single subject methodology. The behavioral researcher surrounded by individuals who view single subject experiments as little more than pilot studies is under strong pressure to conduct large scale investigations. This may be especially true for junior faculty working toward promotion and tenure.

Concerns (justified or not) about how review panels and funding agencies will respond to grant proposals may also con-

[1] Group statistical designs can be a useful research method. In attempts to compare two or more treatments without encountering multiple treatment interference, it may be most practical to use a group statistical design (Campbell & Stanley, 1963; Kazdin, 1973). This type of design is also most appropriate for examining whether a treatment is applicable to a wide variety of individuals (O'Leary and Kent, 1973). However, given the limited success of obesity treatments, it seems premature to be concerned with generality of treatment methods.

tribute to a reluctance to use intrasubject replication designs. Funding agencies seem likely to support research that appears to promise a significant effect on large numbers of people. Moreover, single subject experimental methods may not be well known to many reviewers.

Lastly, experimental group designs may seduce behavioral obesity researchers, because it may be much more impressive to report a program having a significant impact (albeit only a statistically significant one) on a large number of subjects than to report having helped one or two individuals lose weight. Additionally, all researchers want to have an impact on their field. For applied scientists this includes developing treatments that benefit large numbers of individuals.

Whether or not a treatment is generally effective across a category of patients is an important empirical question. However, it may be more beneficial to our understanding of the problem of obesity to focus on accounting for the different effects a treatment has on different patients. The data suggest no reason to abandon the principles of behavior when devising obesity treatments. It may be that the failure to assess treatment tactics through experimental analysis is preventing the development of better technology.

Brownell and Jeffrey (1987) have suggested that to improve the effectiveness of behavioral obesity treatments, research is needed to define personal variables (e.g., lifestyle, personality, weight history, demographics, family relationships) that will allow therapists to match subjects to appropriate treatments. Historically, attempts to find personal predictor variables have involved experimental group methods. Ironically, grouped data eliminate the individuality these studies are designed to investigate. Curves based on averaged data seldom correctly represent any of the cases contributing to them (Sidman, 1960). Extended collection of data on individual behavior could ascertain the personal variables functionally related to treatment responses (Harzem, 1984). We seem to need to remind ourselves periodically of the value of single subject research designs.

REFERENCES

Abramson, E. E. (1983). Behavioral treatment of obesity: Some good news, some bad news, and a few suggestions. *The Behavior Therapist, 6,* 103–106.

Bellack, A. S. (1986). Schizophrenia: Behavior therapy's forgotten child. *Behavior Therapy, 17,* 199–214.

Bergin, A. E. (1966). Some implications of psychotherapy research for therapeutic practice. *Journal of Abnormal Psychology, 71,* 235–246.

Bergin, A. E., & Strupp, H. H. (1970). New directions in psychotherapy research. *Journal of Abnormal Psychology, 76,* 13–26.

Brownell, K. D., & Jeffrey, R. W. (1987). Improving long-term weight loss: Pushing the limits of treatment. *Behavior Therapy, 18,* 353–374.

Brownell, K. D., & Stunkard, A. J. (1978). Behavior therapy and behavior change: Uncertainties in programs for weight control. *Behaviour, Research, and Therapy, 16,* 301.

Campbell, D. T., & Stanley, J. C. (1963). Experimental and quasi-experimental designs for research and teaching. In N. L. Gage (Ed.), *Handbook of research on teaching* (pp. 171–246). Chicago: Rand-McNally.

Coates, T. J., & Thoresen, C. E. (1980). Obesity among children and adolescents: The problem belongs to everyone. In B. Lahey and A. E. Kazdin (Eds.), *Advances in clinical child psychology* (pp. 215–263). New York: Plenum Press.

Coates, T. J., & Thoresen, C. E. (1981). Behavior and weight changes in three obese adolescents. *Behavior Therapy, 12,* 383–399.

Colvin, R. H., & Crist, K. (1983). The futility of follow-up in current behavioral studies of obesity. *The Behavior Therapist, 6,* 152–153.

Donahoe, C. P., Jr., Lin, D. H., Kirschenbaum, D. S., & Keesey, R. E. (1984). Metabolic consequences of dieting and exercise in the treatment of obesity. *Journal of Consulting and Clinical Psychology, 52,* 827–836.

Eysenck, H. J. (1952). The effects of psychotherapy: An evaluation. *Journal of Consulting Psychology, 16,* 319–324.

Eysenck, H. J. (1965). The effects of psychotherapy. *International Journal of Psychiatry, 1,* 97–178.

Foreyt, J. P., Goodrick, G. K., & Gotto, A. M. (1981). Limitations of behavioral treatment of obesity: Review and analysis. *Journal of Behavioral Medicine, 4,* 159–174.

Hall, S. M., & Hall, R. G. (1974). Outcome and methodological considerations in behavioral treatment of obesity. *Behavior Therapy, 5,* 352–364.

Harzem, P. (1984). Experimental analysis of individual differences and personality. *Journal of the Experimental Analysis of Behavior, 42,* 385–395.

Hersen, M., & Barlow, D. H. (1976). *Single case experimental designs.* New York: Pergamon.

Jeffery, R. W., & Coates, T. J. (1978). Why aren't they losing weight? *Behavior Therapy, 9,* 856–860.

Johnston, J. M., & Pennypacker, H. S. (1980). *Strategies and tactics of human behavioral research.* Hillsdale, NJ: Lawrence Erlbaum.

Katell, A., Callahan, E. J., Fremouw, W. J., & Zitter, R. E. (1979). The effects of a behavioral treatment and fasting on eating behaviors and weight loss. *Behavior Therapy, 10,* 579–587.

Kazdin, A. E. (1973). Methodological and assessment considerations in evaluating reinforcement programs in applied settings. *Journal of Applied Behavior Analysis, 6,* 517–531.

Kazdin, A. E. (1981). Drawing valid inferences from case studies. *Journal of Consulting and Clinical Psychology, 49,* 183–192.

Kazdin, A. E. (1982). *Single-case research designs: Methods for clinical and applied settings.* New York: Oxford University Press.

Lansky, D. (1981). A methodological analysis of research on adherence and weight loss: Reply to Brownell and Stunkard (1978). *Behavior Therapy, 12,* 144–149.

Leitenberg, H. (1976). *Handbook of behavior modification and behavior therapy.* Englewood Cliffs, NJ: Prentice-Hall.

Mahoney, M. J. (1975). Fat fiction. *Behavior Therapy, 6,* 416–418.

O'Leary, K. D., & Kent, R. (1973). Behavior modification for social action: Research tactics and problems. In L. A. Hammerlynck, L. C. Handy, & E. J. Mash (Eds.), *Behavior change methodology concepts and practice.* (pp. 136–151). Champaign, IL: Research Press.

Sidman, M. (1960). *Tactics of scientific research.* New York: Basic Books.

Straw, M. K., & Terre, L. (1983). An evaluation of individualized behavioral obesity treatment and maintenance strategies. *Behavior Therapy, 14,* 255–266.

Stunkard, A. J. (1977). Behavioral treatment of obesity: Failure to maintain weight loss. In R. B. Stuart (Ed.), *Behavioral self-management: Strategies, techniques, and outcome* (pp. 317–350). New York: Brunner/Mazel.

Stunkard, A. J., & Pennick, S. B. (1979). Behavior modification in the treatment of obesity. *Journal of General Psychiatry, 36,* 801–806.

Whitman, T. L., & Johnston, M. B. (1987). Mental retardation. In M. Hersen and V. B. Van Hasselt (Eds.), *Behavior therapy with children and adolescents* (pp. 184–223). New York: John Wiley.

Wing, R. R., & Jeffery, R. W. (1979). Outpatient treatments of obesity: A comparison of methodology and clinical results. *International Journal of Obesity, 3,* 261–279.

Wooley, S. C., Wooley, O. W., & Dyrenforth, S. R. (1979). Theoretical, practical, and social issues in behavioral treatments of obesity. *Journal of Applied Behavior Analysis, 12,* 3–25.

Wyshogrod, D. (1985). Current treatment of obesity exemplified in a case study. *Journal of Behavior Therapy and Experimental Psychiatry, 16,* 151–157.